"prickers" of the hussar to the old flint-lock musket. Putties, which Mr. Webb traces back to Anglo-Saxon times, are proved by recent discoveries to be as old as the Mycenæan culture.

Much, of course, still remains mysterious. Why has a man's coat its buttons on the right, that of a woman on the left? Is the cockade descended from the chaperon headdress of the time of Richard II.? Whence come the buttons on the jacket of the page and on the trousers of the costermonger? Can it be, as Mr. Webb suggests, that grooms weave straw in the manes of horses because the horse was once thought to be a corn-spirit? Such matters require for their solution a wider range of induction and a more scientific study of the evidence than is provided by the present book, which raises, if it fails to solve, many other curious problems of the same kind.

MODERN VIEWS OF ELECTRICITY.

Modern Views of Electricity. By Sir Oliver Lodge, F.R.S. Third edition, revised. Pp. xvi+518. (London: Macmillan and Co., Ltd., 1907.) Price 6*s*.

WHEN Sir Oliver Lodge decided to issue a new edition of his well-known treatise, he set himself a very difficult task. The first edition was published in 1888, the second in 1892; he might well have thought that the development of the science during the past fifteen years had been so rapid that nothing short of complete re-writing could render the book deserving of its title. However, he has concluded that, since recent progress has amplified our views of electricity rather than altered them, the treatise has not lost its value; that it is still an expression of the truth, though it may be only a partial expression. Accordingly the general plan of the third edition is the same as that of the first; the changes that have been made consist of a few minor alterations and omissions, together with the addition of six appended lectures.

The earlier editions are so familiar that no detailed comment is necessary. Electrostatic, conductive, and magnetic processes are described and illustrated by a series of mechanical analogies, leading up to the representation of the electromagnetic ether as a medium made up of elastically connected gear wheels, separated in some regions by surfaces of slip. In the elaboration of these analogies the author is seen at his best; everything that he writes is extremely suggestive, though some students may be puzzled by the inconsistency between the different illustrations that are used in different parts of the book to represent the same action. We would direct special attention to the admirable treatment of the magnetic effect of materials with a permeability greater than unity.

However, we think that the author has underrated somewhat the change in even the simpler parts of the work, which has been necessitated by recent discoveries. It is true that these discoveries have affected our views of the electric properties of matter rather than the properties of electricity itself, but all electrical experiments involve the use of material bodies. Thus the discovery of the great difference between positive and negative electricity invalidates Sir Oliver Lodge's representation of the magnetic field. He can no longer account for the negative result of Maxwell's attempt to find a finite angular momentum in a closed current circuit by the existence of two oppositely directed streams of positive and negative electricity; there must be a gyrostatic effect, though it is too small to be detected by any arrangement devised at present.

Again, our view of the effect of a material dielectric on electrostatic phenomena has changed completely. It is not believed now that the presence of sulphur alters the properties of the lines of force issuing from a neighbouring charged body; the effect of the sulphur on electrostatic actions should be represented in the same way as the effect of iron on magnetic actions. The view that all electric actions take place in the medium surrounding a charged body and not in the body itself has been modified; attention has been concentrated once more on the importance of the conception of a charge. It is misleading to speak of the dispersion of light as obscure and to suggest that it has no causal connection with selected absorption. The old view that a dielectric resists the passage of a current but may be "broken down" by a force sufficiently great suggests that a perfect vacuum devoid of all resisting matter should be a perfect conductor, and is utterly discordant with modern views. If the author did not see his way to re-write the book completely, we think that at least he should have added copious notes on these and many similar points to warn the student that the older statements must be revised in the light of later knowledge. As it stands, the book is of immense interest to those to whom modern conceptions are familiar, for it enables them to grasp at once the bearing of those conceptions on fundamental problems, but it would be dangerous in the early stages of reading.

We have detected one misprint on p. 224, l. 24: for "infinite" read "finite." We must also protest strongly against the use on p. 255 of the expression "centre of gravity of the ether" in place of "centre of mass." There is no evidence whatever that ether has a centre of gravity. N. R. C.

ENGLAND AN EXAMPLE FOR GERMANY.

Der naturwissenschaftliche Unterricht auf praktisch-heuristischer Grundlage. By Dr. F. Dannemann. Pp. xii+366. (Hanover and Leipzig: Hahnsche Buchhandlung, 1907.) Price 6 marks.

WE are accustomed in matters relating to school teaching to have German methods and results eulogised by contrast with our own, so that it is especially gratifying for once to find the tables turned. The author is a leading exponent of science teaching in his country, a schoolmaster of high repute in secondary schoolwork, and he has written this elaborate work frankly on the model of teaching that he witnessed at Harrow and other English secondary schools; and he has produced an account which in some respects is more thorough and comprehensive than anything we have in England. The only work to compare with it is the American book by Smith and Hall which appeared two years ago, and that deals only with chemistry and physics, while Dr. Danne-

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